

The Mining Journal

RAILWAY AND COMMERCIAL GAZETTE

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

No 368. -Vol. XII.]

LONDON: SATURDAY, SEPTEMBER 10, 1842.

[PRICE 6D.]

STANNARIES OF CORNWALL.

IN THE VICE-WARDEN'S COURT.

WHEREAS, the Vice-Warden did, by two several orders or decrees, made in the above-mentioned court, and bearing date respectively the 25th day of January, 1842, and the 7th day of May last, order that a SALE be made of (the most other things) the MACHINERY AND MATERIALS belonging to GUNNIE LAKE MINE, in the Parish of Calstock, within the said Stannaries, under the direction of the Registrar of the Court, and that the proceeds of such sale should be applied by the said Registrar in the manner directed by the same orders or decrees. Notice is hereby given, that pursuant to the said orders or decrees, a PUBLIC AUCTION will be held at Gunnie Lake Mine aforesaid, on Thursday, the 15th day of September, instant, at Eleven o'clock in the Forenoon, for selling, either together or in lots,

THREE STEAM-ENGINES.
Viz., a steam-engine, 4-horse, cylinder, with cast-iron beam, two boilers, about twenty tons, caps and brasses, and balance-hob, a steam-engine, 14-horse cylinder, piston and rod, condensing work, nozzles and condenser pipes, hand gear, parallel motion, brass bearings and valves, &c., complete; and a steam-whim engine, 10-horse cylinder, with cage, span beam, upright stays, &c.
For viewing the same, application may be made to Captain George Bennett, at the mine; and for further particulars (if by letter prepaid) to Mr. Stokes, solicitor, Truro. -Dated Sept. 1.

STANNARIES OF CORNWALL.

IN THE VICE-WARDEN'S COURT.

WHEREAS, the Vice-Warden did, on the 13th day of August last, order and decree that a SALE be made of (amongst other things) the MACHINERY AND MATERIALS belonging to the WHEAL HARMONY, CARDREW, AND MONTAGUE CONSOLIDATED MINES, in the Parish of Redruth, within the said Stannaries, under the direction of the Registrar of the Court, and that the proceeds of the sale should be applied by the said Registrar in the manner directed by the same order or decree. Notice is hereby given, that pursuant to the said order or decree, a PUBLIC AUCTION will be held at the Wheal Harmony, Cardrew, and Montague Consolidated Mines aforesaid, on Tuesday, the 24th of September instant and following days, at Eleven o'clock in the forenoon of each day, for selling, either together or in lots, the undermentioned MINING MACHINERY AND MATERIALS, viz., SIX STEAM-ENGINES—one 7-horse cylinder, 10-horse cylinder, 10-horse cylinder, 10-horse cylinder, 10-horse cylinder, 2 boilers, two steam-engines, 10-horse cylinder, 1 boiler each; one 20-horse cylinder, 1 boiler; a water wheel, with iron axle, 37 feet diameter, 4 feet shaft, attached to a crushing-machine and a saw-mill, 4 cast-iron and shears; two 14-horse capstan ropes, 210 fathoms; one 10-horse ditto, 100 fathoms; eleven horse whims, 4 cut heads; two 8-horse cut head ropes, 200 fathoms; two 7-horse ditto, 200 fathoms; two 8-horse cut head ropes, 200 fathoms; two 2-horse ditto, 200 fathoms; eight horse whims ditto, 500 fathoms; 700 fathoms 1/4 inch chain, 225 fathoms main rods, 100 fathoms bucket rods, 90 fathoms 3/4 inch rods, with plates complete, 50 fathoms connection rods, 200 fathoms complete of the following dimensions: 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 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CORAL REEFS.

These objects are so well calculated to excite wonder in the beholder as the coral constructions, and of which those in all their forms, surrounding the greater number of the Polynesian Isles, are perhaps the most remarkable, and which demonstrate, so perfectly, the power of Nature to effect her vast designs, though apparently feeble and inefficient agents. It requires, indeed, an intimate acquaintance with the habits of the lithophiles, and a knowledge of their labours, to credit what stupendous submarine reefs and islands, many miles in compass, are indebted for at least their entire visible structure to the secret economy of these tiny architects. Raffles (one of these islands) is indebted for a large share of her natural beauties, as well as commercial advantages, to the coral fabric which surrounds her shores, these are generally in the form of reefs, and may be considered as a barrier and a shore reef, the former enclosing the island as a breakwater or sea-wall at a distance of one and a half to two miles from the land, presenting a precipitous face to the ocean to receive the assault of its billows, but encroaching, in a superficial and capricious manner, upon the lagoon water it incloses. The shore-reef is continuous with the land around the entire coast, and stretches into the sea to a variable, but very considerable distance. Its greater portion is covered with shallow water, which, in many parts, does not exceed, and is often less, than a foot in depth, its outer margin shelves irregularly, and terminates abruptly in a channel of clear blue water. This channel is continued round the island, and furnishes a natural division between the two principal reefs, as well as a convenient passage for navigation. Coral islets, shoals, or whatever other form the madreporic rock may assume, can be distinctly traced to one or other of these reefs, but never occur as the production of both conjointly. The outer, or barrier reef resembles a wall no less in its structure than in its office, unlike the friable and obsolescent material, we commonly associate with the name of "coral," the rock of which it is composed, is hard, compact, and amorphous, bearing much resemblance to a firm cement, and it is only on its shores extending towards the land, that we notice the elegant form of the tree coral, contrasting so strongly with the rocky and ornamental structure on which it is planted, as to justify a doubt, if both are constructed by the same animals. The summit of the reef is flat several yards in breadth, but little raised above the level of the sea, and washed by a heavy surf which breaks against its sea aspect, courses over its level surface, and falls gently, and, as it were, by a line of cascades, into the placid basin on the opposite side. At ebb tide, when the surf is less in amount, this reef is partly dry and accessible, but when the tide is high, or the weather tempestuous, the sea roars into magnificent arches, beats over the rocky barrier with terrific grandeur, and with a rolling or thundering sound which may be heard on a tranquil night at the distance of several miles. A curious and mysterious feature in the construction of the barrier reef is presented in the occasional apertures that exist in its fabric, and which are of sufficient breadth and depth of water to permit ships to sail through them with facility. The shore reef is chiefly composed of amorphous rock or black coral, though true coral is also abundant upon it as well as extensive beds of sand. In many parts where the water is deep, it presents a submarine picture of extreme beauty, extensive coral groves, planted in beds of smooth and white sand, and mingling hues of pink, blue, white, and yellow, appear through the transparent sea, numerous small fish of brilliant colours glide over the sands, thread the labyrinth of the coral branches, or when alarmed dart rapidly for shelter into the numerous recesses of the stony thickets, the whole forming a peculiarly pleasing and almost kaleidoscopic effect.

BIOGRAPHY OF THE FATHER OF ENGLISH GEOLOGY.

The subject of this memoir, William Smith, was born March 23, 1769, at Churchill, in Oxfordshire, over, as he was fond of remarking, "the oolite formation." His patrimony being small, he engaged in the profession of a surveyor of land; and, in the course of the acquisition of professional knowledge, it was his delight to store facts in reference to the strata which surfaces he measured and apportioned as a matter of business. In 1791 he was employed in Somersetshire; and some years later in the execution of the Somerset Canal. Here he frequently descended the coal pits, and obtained much information on the coal measures, from the colliers and his own personal inspection. In the course of this period, he became intimately acquainted with the minute characteristics of the stratification around Bath, which, including the coal measures, embraced some of the most important of our English rocks and clays. He in time collected numerous organic remains, all of which he was careful to label in reference to the precise positions from which they were derived. He was now called in survey on the Cotswold Hills; and early in 1794, to attend Parliament in connection with the business of the Somerset Coal Canal Company. At this period of his life, Mr. Smith was entirely unacquainted with books on physical geography or natural history; although, even if he had been learned in their lore, there was little at that time published that could have materially assisted him. In his inquiries, and his ignorance was proved by numerous particulars; and chiefly by his adoption of the local designations of the particular strata, and the employment of a harsh terms as would be given and recognized in the respective neighbourhoods of the rocks. In 1796 he began to arrange his collection of fossils from the vicinity of Bath, in the order of the strata; and before 1799 he had coloured geologically the large sheets of the Somersetshire survey, and a circular map of the vicinity of Bath, both remarkably accurate. By maps and sections, also, he explained to numerous scientific gentlemen, who were attracted by the novelty of his system to visit him, those views relating to the regular succession and continuity of strata, and the definite distribution of animal and vegetable remains in the earth, which are now placed in the first lessons of geology. The great distinctive features of Mr. Smith's system were those clearly presented to his own mind, and to the minds of others. They were these:—That the fossil productions of the several strata are not only distinct and unconfusedly distributed in them, but that each species has its own peculiar place, as belonging to some particular stratum; that this species may be either confined to that stratum solely, or to that and other particular strata in conjunction; that, in the first case, it becomes an infallible test of the identity of two strata occurring in two different localities, and in the last case a collateral proof of that identity. By the assistance of some friends he was enabled in 1799 to bring out a small "Tabular View of the Superposition of English Strata;" and, in 1801, a prospectus for an "Accurate Delimitation and Description of the Natural Order of the Various Strata of England and Wales, &c." This prospectus is, in itself, a brief compendium of the practical applications of geology, and displays the growing mastery of the subject, which was finally proved beyond a doubt by the appearance, in 1815, of the principal portion of his "Delimitation of the Strata of England and Wales." This work was a large map, in fifteen coloured sheets, of the kind now known as geological maps, and was the earliest production of this our ancient geologist. Considered in this light, and also, indeed, in that of a new approach to general accuracy, its merits can scarcely be overrated. In 1800 he published a treatise on stratification. From this period up to 1813, he had attracted notice in various ways; and, in that year, when his great work appeared, the British Museum purchased his whole collection of fossils for 500*l.* The task of arranging these led to the publication of two small quarto, entitled *Strata Identified by Organical Fossils* (1815); and *Stratigraphical System of Depositional Powers* (1817); the latter being designed as a guide to the specimens in the museum. Between the appearance of the great map in 1815 and 1821, Mr. Smith published no less than twenty geological maps of English counties, often remarkable for their near approach to accuracy. In 1821 he delivered a course of lectures on his favourite science to the members of the Yorkshire Philosophical Society, and repeated them the two years, in conjunction with his nephew (the well-known Professor Phillips, the author of several works on geological subjects), at Scarborough and Hull. In 1823 similar lectures were delivered at Sheffield, and efforts were made to secure some permanent engagement for Mr. Smith. He at length was offered and accepted an appointment as agent to Sir John Lubbock, Bart., at the beautiful retreat of Huddersfield, near Scarborough. Here, as usual, he set himself to geological research, the result of which was agreed to in a map and a collection of fossils. The practical value of his knowledge has been most triumphantly proved in the instance of the Great South Western Railway, in Devon; for, in 1825, Mr. Smith recommended to Colonel Boscawen, the proprietor of the estate, to search for coal beneath the magnesian limestone. The idea of such a search was always positively held to be one of great uncertainty in his mind, and by some was entirely ridiculed. The issue of the experiment has proved the most fortunate possible in Colonel Boscawen and others, for significant coal has been obtained, although not without considerable difficulties in sinking the shafts. Our geologist was subsequently qualified, and partially rewarded for his services, in the presentation to him, in 1831, by the Geological Society of London, of the first Wollstonehouse medal, accompanied by a mention and eloquent eulogium by Professor Sedgwick, in the course of which he stated Mr. Smith the "Father of English Geology." In the same year, when the British Association assembled at York, made application to Government for a pension to Mr. Smith, which was ultimately voted upon from 1835 to the amount of 100*l.* annually. The increasing gratification of our philosopher was terminated at Bath, in 1843, when the University, during the meeting of the British Association in that city, conferred upon him the degree of D.D. Several of the Strata suggested the pleasure of again conversing with him, in 1843, at the meeting of the British Association at Birmingham; great, however, was their regret

and surprise to hear that Dr. Smith had closed his life and labours at Northampton, September 23d, while on a visit to a friend, in his way to the meeting. It was a remarkable coincidence, that a wish of his, often half-jocularly and half-seriously expressed, had been realized in the site of the place of his death. He had often said that he wished he might close his labours on the stratum on which he had commenced them—viz., the oolite. Northampton is situated on the oolite; and in St. Peter's Churchyard repose, on that very stratum, the remains of "Strata Smith." It will readily be conceived, from these remarks, that Dr. Smith was an acute observer of common, and hitherto usually neglected, facts. A spring in a field, a stone, a building, a quarry, a clay-pit, brick-field, lime-kiln, and even a ploughed field, were all made to minister to his favourite science, and all to minister well, though not always with novelty. He was appointed to accompany Mr. Barry and other commissioners upon their investigations into the durability and suitability of the stone for the new Houses of Parliament, and he frequently astonished those gentlemen by the accuracy of his local knowledge, and the verity of his predictions as to the course and quality of certain rocks. No opportunity of studying the properties of stone was neglected by him, and no time was deemed unavailing by him for such inquiries. If attending a parish church to which he was a stranger, he was sure to spend some time before or after service in the churchyard, observing how far the stones had become worn by the weather in proportion to their age. It was remarkable that his cheerfulness and hilarity continued almost to the last day of his life. He died of natural decay, at the age of seventy-one, and without pain; his temperate and active habits, together with the healthy character of his pursuits, having kept him hale to the last.

INTERESTING GEOLOGICAL NOTICE OF FRANCE.

(Abstract of Paper read before the Manchester Geological Society.)

France, it was observed, was one of those countries in Europe where geological phenomena were developed on the largest and most striking scale. The tertiary basins of Paris, of Auvergne, and of the Gironde, the oolite formations of the Jura, the volcanic formations of Auvergne and the Cantal, and the primary formations of Brittany, Dauphiny, and the Pyrenees, present fields of research to the student which are almost inexhaustible, and are, at all events, calculated to occupy the time and attention of many careful observers, whether from the formation of valleys, the cuttings of rivers, the action of the sea on the coast lines, or still more from the dislocations attending the lines of the principal mountain chains. Most of the geological phenomena of France lie ready to the hand and hammer of any one who chooses and knows how to observe; and the works published on the various districts, with the public collections of the capital, open to everybody's examination, render the study of French geology doubly attractive from its facility. Thus, the hills of Montmartre and Grignon, in the Paris basin, are, in themselves, museums and books which anybody can readily study who can approach them; and the volcanoes of Auvergne are still fresh in appearance, and preserve all the usual phenomena of past igneous action. It is, however, from the similarity and geological connection subsisting between the French formations and those of the British Islands, that the study of the former becomes of importance to the British geologist; it forms the complement of his previously acquired knowledge of his own country's geological condition; and, from its being of ready access, a knowledge of it becomes almost indispensable. The object of the paper was stated to be, to give only some general indications of the extent and nature of the principal formations of France, which were enumerated, as follows, in a descending order, according to their dates, more or less recent:—1. Tertiary Formations.—The basin of the Gironde, including a wide extent of country, on each side of the Gironde; and all that extensive portion of ancient Gascony and Gascogne, known by the name of the Landes. The tertiary basin of the delta of the Rhone, and the neighbourhood of Arles. The Paris basin, which is divided into two not very unequal portions, by the Seine, but is not so extensive as that of the Gironde. The Lyons basin, including a long tract, through which the Rhone flows; and also along the eastern bank of the Rhone, after its junction with that river. The Strasbourg basin, on the Rhine, between Basle and Mayence. To these may be added part of the great tertiary formation of the Netherlands, in the immediate neighbourhood of Dusseldorf; but this can hardly be comprised among the French formations, properly so called, however closely connected with them it may be in a geological sense.—2. Secondary Formations.—The great chalk formation of the north of France, including the green sand, and associated formations, with gault, wealden clay, &c., which surrounds the Paris tertiary basin, and extends through Normandy, Touraine, and Champagne into Artois. A similar formation, but on a much smaller scale, to the north of the basin of the Gironde, extending from Malmouille into Périgord, another skirting the Pyrenees, and a fourth to the east of the Rhone. The oolite formations of the Jura, which commence near Grenoble, and extend north-easterly, to the neighbourhood of Strasbourg on the Rhine. This is one of the most important and best developed in France. The oolite and other formations above the carboniferous series, which intervene between the chalk series of Normandy and the primitive district of Brittany. A similar series, which commences near Poitiers, and extends north-eastward through France, in an irregular manner to Metz, the Moselle, and the Rhine. And another series, of the same kind, forming great part of ancient Languedoc and Provence, with a long tract skirting the Pyrenees on the north. There are smaller formations of the same nature, such as those at Boulogne, in Picardy, &c.—3. The carboniferous and mountain limestone formations of the north-east of France, at Valenciennes, &c., forming part of the same series in the Belgian and Prussian territories. The coal-field of St. Etienne and its environs south-west of Lyons; the coal and iron field of Normandy, and parts of the Limousin, &c.—4. The older formations, including all beneath the carboniferous or mountain limestone series, the Silurian system, the schistose, the granitic, and the other primitive systems. The district of Brittany, which is one of considerable extent, terminated towards the east, by a curved line extending from Angers, on the Loire to Cherbourg on the British Channel, on the south by a line from Metz to the ocean, and on the west and north by the coast lines of La Vendée and Brittany. The granitic district of the Pyrenees, which includes the whole of that stupendous range of mountains, and is of peculiar interest in the geologist and mineralogist, from its phenomena of dislocation, and from the great variety of mineral products to be met with throughout the whole line; the primitive district of Provence and Dauphiny, which forms part of the Alpine chain, and can hardly be studied without connecting the general series of the Alps with it; the great central granitic plateau of Auvergne, one of the most remarkable formations in Europe, from its being in immediate juxtaposition with the tertiary formations of the Limousin, of Auvergne, and the sandy formations of Berry, and also from its being pierced by the number of immense volcanoes, which must have made this district, in former ages, one of the most extraordinary spots of the globe. This great central formation, which is of vast extent, is connected with similar formations in the Cantal, Roumou, Volvy, Forez, and the Nivernais, throwing out into these latter provinces branches or arms, which connect it with almost all the other formations of France. The granitic district of Alsace, and the schistose districts, on the north eastern or Belgian frontier, complete the transition and primitive formations.—5. The volcanic formations of Auvergne, of the Cantal, Volvy, Languedoc, and Provence, may all be studied separately from the formations through which they have pierced, and they are found to none in Europe for extent or richness of mineralogical treasures.—The paper then continued with observations on the extent, &c., of the tertiary basin of the Gironde; the great tertiary formation of the north of France, and those of other portions of the kingdom; the oolite or jurassic series (including all the associated beds, with the lias); the new red sandstone formation, and the coal series (which last, as being interesting in this neighbourhood, we give)—Coal-fields do not exist in France on anything like the same scale as in the British Islands. The principal are at St. Etienne, near Lyons, in the midst of the granitic district of La Forez, and on the Belgian frontier, near Valenciennes and Mons. The coal-field of St. Etienne is of small extent, not greater in superficial than in the line of Wright, but it is very productive, and furnishes iron, of bad quality, as well as combustible materials. The measures are much dislocated by faults, and the district is very hilly; the coal is highly sulphurous, and rich in small remains. There is a small formation of the same kind near Nevers, but this is worked more for the limestone it yields than for the coal. The coal-field of the Belgian frontier belongs, geologically speaking, to Belgium rather than to France. The coal is of excellent quality, and very abundant; the measures are in general deep, and more horizontal than at St. Etienne. Coal is worked near Namur, on our side, and becomes of good quality exists in the same formation. Near Montignieu coal is also extracted, and it may be said to exist in formations of very different ages in many localities throughout France, but the only coal fields of any real importance are those of St. Etienne and the Belgian frontier. To these mentioned sources of the Silurian and schistose series; the granitic series, including all the igneous rocks, and properly speaking, volcanoes; and, lastly, the volcanic series. In conclusion, it was concluded, that the geological changes now in progress, whether from the elevation of mountains, the shifting of water courses, the trends of the sea, the formation of marshes, &c., are, from the great extent of surface where they take place, of an small weight in the geological annals of Europe. Thus the late basin of the Rhone, being over a space of 150 miles in length, the alterations of its channel, and the deposits left by such a deluge are well worthy of study, and will be doubt be carefully observed by local geologists.

Geology.—John Tomkinson, Esq., of Liverpool, has presented to the museum of King William's College, through E. G. Goudard, Esq., of the Ashby, Leicestershire, two large slabs of sandstone, dug from his grounds at Blitham, Leicestershire. These slabs are of peculiar interest to the geologist, as they have in them very distinct impressions of the footprints of an extinct animal, known to geologists by the name of *Chirotherium*.

AMERICAN METAL TRADE—NEW TARIFF.

[From the Report of the Commission appointed by Congress.]

IRON.—Amount of iron manufactured; according to the census of the United States for the year 1840, there are 604 furnaces, which produce 366,963 tons of cast-iron. It is believed that one-fourth of this quantity—viz., 71,726 tons, is made into forms, such as hollow ware, machinery, plough-castings, stove-plates, &c., and when so made is worth in market an average of \$80 per ton, \$5,738,080; the remaining 215,177 tons of pig-iron is converted into wrought-iron, and is merged (allowing for waste in the manufacture) in the 197,233 tons mentioned below.—2d. According to the same authority there are 795 bloomeries, forges, and rolling-mills, which produce 197,233 tons of bar, hoop, sheet, and other wrought-iron, which is worth in market \$85 per ton, \$16,764,505.—3d. According to the report of the Secretary of the Treasury for 1840, there were 5515 tons of pig-iron imported in that year, which were converted into forms at an average cost of \$50 per ton, \$275,750.—The whole value of iron made in the United States in 1840, was \$22,778,335.

METALS OTHER THAN IRON.—The value of the manufacture of lead is very great, amounting to, at least, \$3,180,000—that of shot alone amounts to over \$600,000; of sheet lead, conducting pipe, white lead, red lead, and litharge, to about \$1,500,000—which, with other manufactures, amounts to about \$500,000. The capital employed in these is about \$300,000; and in the other manufactures about \$3,500,000. The number of men employed in the manufacture of shot is about 1000, and in the other manufactures about 5000, besides extensive steam and water power, probably of equal capacity. The productions and manufacture of lead in all their ramifications are abundantly sufficient to supply the whole country, as well as for exportation. Your committee are, therefore, convinced that they should be amply protected. A duty of 15 cent per pound on pig and old lead; 3 cents on shot; and 3 cents on sheet lead, conducting pipes, white and red lead, litharge, and sugar of lead; and 30 cent on all other manufactures of lead imported should be imposed.—There are about 8,500,000 lbs. of pig copper manufactured in the country, most of which is manufactured into sheeting, braziers, bolts, &c. The capital invested in these departments is about \$1,500,000; the amount paid for labour is about \$100,000; number of men employed about 500, together with immense water power. These establishments have the capacity to extend the manufacture at least 50 per cent., and they can abundantly supply the wants of the whole country. The manufacture of copper enters into various kinds of business and compositions for domestic purposes. The value of these manufactures the committee have not been able to ascertain, but, from the best information, it cannot be less than \$2,000,000; the capital not less than \$1,000,000; and the number of men employed 1000. The manufactures of copper ought to receive a protection of at least 30 per cent.—With respect to sheet brass, plated metal, German silver, copper, brass, and plated wire, the committee have ascertained that there is eleven mills engaged in these branches of business alone, with a capital of about \$600,000; the number of hands employed is about 500. These eleven mills are capable of producing annually 8,634,000 lbs. of sheet brass, plated metal, and German silver, which, valued at 30 cents per pound, is \$1,699,200; also, 1,346,000 lbs. of copper, brass, and plated wire, valued at about \$400,000. These mills are abundantly able to supply the demand for these articles, should it be double that for present consumption. The manufacturers unanimously agree that a duty of not less than 30 per cent. will be absolutely necessary to enable them to continue their business, and the committee feel confidence in saying, that by such a protection these several branches of manufacture will become equal to any in the country, and adequate to all our wants.—The next manufacture from copper and other metals is in brass composition, which enters into the furnishing of ship-work, materials used in finishing dwelling-houses, church bells, cannon, and a variety of other articles. This department is very extensive, and no doubt forms a large item in the amount of \$5,527,631 returned by the census as the value of the manufacture of various metals, other than iron, gold, and silver. In fact, it is believed this latter branch of business will nearly reach that sum, and should be amply protected by a duty of 30 per cent.; nothing less will do this.—Britannia wire is now made in a very large amount in this country, and, with a proper protection, would supply the whole demand of the country, but being composed chiefly of iron and zinc, which, as yet, have not been found to a great amount in the United States, are admitted duty free. The amount of capital employed in the manufacture of this wire is about \$500,000, and the number of persons dependent on it from 5000 to 6000. The value of manufacture is \$750,000. A duty of 30 per cent. will be a satisfactory protection.—The manufacture of zinc in sheets for utensils, &c., is now commencing in this country, and it will soon be able to supply any demand that is likely to exist for its use; it ought therefore, to be protected by a duty of 30 per cent. The number of men employed in this manufacture cannot be less than 10,000. A duty of 30 per cent., it is believed, will be ample protection.

BRASS, IRON, AND WOOD SCREWS.—There are in our city (Providence) two manufactures of wood screws, with a capital of \$200,000—making two thousand gross per day—employing 50 men, 300 females, and 50 boys, whose daily wages amount, at the present time, to \$200. They use annually 600 tons American refined iron, reduced to quarter-inch rods, worth \$130 per ton; 750 tons anthracite coal; 1000 gallons sperm oil; 300 carboys sulphuric acid; \$3000 worth of paper and twine, together with many other small articles, which, in the aggregate, amount to a very considerable sum. The capital invested by other manufacturers in the States of Connecticut, New York, New Jersey, and Pennsylvania, amounts to more than \$300,000, with machinery capable of manufacturing a much greater quantity than the two in our city, most of which are now lying idle for the want of a sufficient protection, and when in operation, making an article generally superior to any imported into our country from Europe. This branch of industry cannot be sustained in our country without a legislative valuation on the pound weight, or gross, with an ad valorem duty of at least 30 per cent.

ON LAURENCE ACID.—This acid is obtained in the usual mode, by the addition of tartaric acid to a hot solution. Soda-sap prepared with pure laurel-oil has the appearance of a colourless oil, which, on cooling, becomes a solid crystalline transparent mass; it is very soluble in strong alcohol, and still more so in ether, but it does not separate from either of these solvents in the form of crystals. Its fusing point is lower than that of the laurel-oil itself, being about 167° Fahrenheit. The alcoholic solution has a strong acid reaction. The acid separated in the mode above described is a hydrate; its formula is $C^{12}H^{10}O^6$, and that of the anhydrous acid, combined with bases in salts, is $C^{12}H^{10}O^5$. Laurensic acid, therefore, contains, in the state of hydrate, an atom of water, which in salts is replaced by an equivalent of base. Bay-berries contain, besides, a considerable quantity of fixed green fatty matter and resin, but the last-mentioned does not possess any peculiar acid properties.—M. MARSH.

EXTRAORDINARY DISCOVERY OF FOSSIL REMAINS.—Intelligence from Rio de Janeiro mentions the following remarkable circumstance.—Dr. Lund has discovered in the cavities of the chalk formations in Minas Geraes some petrifications of human bones, among relics of *Platystrophia Bucklandii*, *Chamaeleon Humboldtii*, *C. major*, *Dasyatis sulcata*, *Hydrocerus sulcata*, &c. Dr. Lund explored nearly 800 of the pits, and among the mammalia he collected 115 species, though only eighty-eight species now inhabit those regions. The human bones are partly petrified and partly intersected by particles of iron, and on being broken they have a metallic lustre. The skulls that have been found are singularly flat, so much so that the backward inclination of the forehead commences immediately above the sockets of the eyes. From this peculiarity Dr. Lund infers that Brazil must have possessed a very ancient population, whose existence may be dated to at least 3000 years ago, and that to all appearance the natives were a race of men with flat skulls, but otherwise of natural formation, representations of which may be seen in Mexican monuments. In as far as regards the natural structure of the flat skulls above alluded to, Dr. Lund appears to have fallen into a mistake. He probably forgot that in the earliest periods of the discovery of America, the shores of the Upper Amazonia were inhabited by a race of men (Cambeba) whose skulls were completely flattened by artificial means. The operation was performed immediately after birth, by pressing the skull of the infant between two boards, so as to impart to it a form corresponding with the idea of beauty entertained by that people. In the *Thomomys Desmarestii* as *Rio de Janeiro*, the Cambeba tribe is particularly mentioned, and in the 17th century they inhabited a locality not far distant from the then Spanish province, Los Maimas. Possibly this race was very numerous and widely scattered, for so flat even to this day that the custom of boring the lips and ears, as practised by the *Chiriguano*, prevails among various tribes from Santa Cecilia in Amazonas. But a firm of skull quite the reverse is found to exist among the North American tribes in the neighbourhood of Columbia. There the heads of infants are, by means of boards and bandages, pressed into a high pyramidal shape. The missionary, Jeanes Lee, found the skulls of the *Chiriguano* tribe, on the *Madreanah*, so shaped, that from our ear to our eye measured more than from the forehead to the back part of the head. Mr. Conche, who recently discovered some philosophical lectures in Heidelberg, office, in his work entitled *Notes on the United States of America*, some philosophical observations on the singular form of the skull. No people on the face of the earth have ventured on such capricious disfigurements of the human body as the American aborigines, and there can be no doubt that the customs practised by them have existed since the remotest antiquity.

ENGINEERING, ARCHITECTURE, ARTS, AND MANUFACTURES.—This department, under the supervision of Professors Hall, Mowley, Daniell, Williamson, Hosking, Dyce, and Ansdan, and Mr. Bradley, Mr. Cowper, Mr. Tennant, Mr. A. Mowley, and Mr. Castle, will be **RE-OPENED** on Tuesday, the 4th of October next. A Class for Pupils, not under the age of fourteen years, will also be re-opened on the same day. Further information may be obtained at the Secretary's office, on September, 1823.

J. LONSDALE, Secy.

SMOKE NUISANCE.—ECONOMY OF FUEL WITHOUT
THE NUISANCE FROM SMOKE, by C. W. WILLIAMS'S AIR FURNACE.
 The principle of this furnace consists in the mode by which the air is introduced to the gaseous matter evolved from coal, whereby a more perfect combustion of the constituents is effected, the process being conducted on the true chemical principle, as explained by Mr. Williams, in his *Treatise on the Combustion of Coal*, first published on this principle, may, by permission, be daily seen in action at the Liverpool and Harrington Water-works, Noho-street, Liverpool.
 For further information, apply to Bircho and Co., agents, 5, Town-hall-basement, Cross-street, Manchester; or to Mr. C. W. Williams, Liverpool.

is especially patronized by the British and other Governments, the Honourable East India Company, the New River Company, the principal dock companies, &c., is particularly recommended to the nobility, gentry, West India proprietors, emigrants, and others, it having been proved by public bodies, and gentlemen of the first distinction, to surpass all other paints as an out-door preservative. It is adapted for every description of iron, wood, or brickwork, masonry, &c. fronts, however exposed to sea or weather. Any colours can be laid upon it. Colours, Bright stone, drab, and yellow, &c. may be laid in any quantity. Colours, Bright red, black, and green, per cent. invisible green, grey, and bright green, drab, &c. in casks of 20 lbs., 50 lbs., and 112 lbs. each. Oil and brushes. Walter & Co. (necessary for the inventors), 15, Tottenham Court, back of the Bank of England, where the most flattering testimonials may be seen from the nobility and gentry, who have used the anti corrosion for many years.

—THE PATENT STUCCO PAINT CRUIST.—Its extraordinary qualities are rapidly becoming well known and appreciated—it will adhere to any substance or surface—no wet or damp or frost can have any effect on it—time hardens and improves it—a house covered with it becomes secured by steel—the cost is trifling—the invention is a fortune to builders, and to all who are interested in house property, old or new. The sole agents for the patentees are Messrs. Mann & Co., 11, Mark Lane, Queen Street, Chancery.

At Manchester, Lower Street, Victoria - W. K. C. confidentially recommends the above CEMENT in the notice of Architects, Builders, &c., &c., from its possessing the following properties, hitherto unknown in other cements, namely - It continues to harden after it has set, until it becomes of the same appearance as stone and is not easily distinguished therefrom either by fracture or otherwise. Its durability is proved by the fact, that after having set for several years, it will resist other polychromatic and using it again, as in the first instance. Its colour is as superior, that it renders neither paint nor coloring, while at the same time, if required, it will take either very readily. It does not throw out either vegetable or crystalline matter upon the surface, or highly injurious to the appearance of buildings. It stands the frost without the least injury. It improves by keeping any length of time before using. It does not possess the quick setting qualities of the Portland cement, but is sufficiently quick for almost all purposes for which cements are used. It has been extensively used in various parts of Devonshire for the last six years, in the entire satisfaction of architects and other scientific men. Also, a very superior quick setting CEMENT, for Fronts of Buildings, Mouldings, Castings, &c. which will take paint or coloring very readily. Above:- How Ground and Packed in Casks. Specimens may be seen at the

—Apply to W. M. Collier, at the Cement Manufactory, as above.

CLAYTON'S ASPHALT.—Established March, 1856, for working the Mineral Asphaltum North of Pyshtown, Maryland.—This valuable material has been extensively used, since its first introduction into this country, for the following purposes:—For pavements, walks and other, in the domestic approach to mansions, gardens, walks, and terraces; the flooring of kitchens and other basement offices; also of church houses and schools, dog kennels, barn floors, cow houses, pigsties, poultry houses, run racks, and moultings.—For roofing, covering of eaves and other arches, the lining of underground culverts over rivers, to prevent the ingress of the tide; also in covering the ground line of walls, to prevent decay there, thereby rendering them almost durable; the construction of water walls built for resistance to the pressure of water, for docks, break walls, and walls built for resistance to the encroachments of the sea. For lining of tanks, diving ponds, and other hydraulic structures. Several extensive works have been executed by this company for the Board of Ordnance and her Majesty's Commissioners of Woods and Forests. The Asphaltum has been used at the Thames Tunnel, also at the London and Greenwich Railway, where it has been laid over a surface of 300,000 superficial feet, to prevent the percolation of water; at the Great Western, Birmingham, Midland Counties, North Western, Brighton, and other railways; at the South Metropolitan, Highgate, and Nunhead Cemeteries. The Asphaltum of Pyrit is perfectly free from smell, and it is not acted upon by change of temperature.—Books of testimonials, with a scale of prices, can at all times be had at the company's depot.

J. FERRELL, Sec.

For the purpose of achieving the use of the foregoing article, architects and others are particularly requested to secure the specifications: "The Boycott Against the Use of Japanese Goods," and not merely "Asphalts," or "Bitumens," as, in many cases, where these terms have been used, gun tar, and other workhairs and others, and positions have been introduced.

[illegible][illegible][illegible]

Source: James H. Hester, Jr., 1910

THE MINING JOURNAL, [

We last week gave the substance of a promised, promising to

...of management of the Montreal Central Railway, on Mr. ...

... on the records of the present, from C. W. Williams, Esq.

ing enhancement of security will be found in a letter from the Pentagon.

We will take the "refutation" first into consideration, inasmuch that, since our publication of last week, additions have been made thereto, under date the 5th inst., from which we learn that up to that period Mr. HALL was enabled "to report three weeks more regular work of the North Midland engines, and ten days of the Manchester and Leeds engine, which has been so satisfactory in all respects as to form of itself the most complete answer to Mr. KEARSELY," the correctness of which statement can be tested on application to the directors and engineers of the respective lines. With regard to the assertion of Mr. KEARSELY, that "the Manchester and Leeds Company have made a similar trial, but with such unsatisfactory results as to cause them to abandon it (the application of HALL's patent) also," Mr. HALL, after commenting upon the correspondence of Mr. BELL and Capt. LAWS, observes—"The fact is simply this, that the *Skefield* (the engine in question) is at this moment, and has been for the last ten days, running the mail trains between Manchester and Leeds, and that in a most satisfactory manner, consequently my invention has not been abandoned by the Manchester and Leeds Company."

Before we take our leave of Mr. HALL's refutation, we may also observe, that the directors owe it to themselves, as the stewards of the proprietary, to Mr. KEARSELY, their engineer, and more especially to Mr. SAMUEL HALL, whose interests are calculated to be so much prejudiced by the promulgation of the report of their engineer to allow the *Wolff* engine to be fairly tried, employing, as Mr. HALL suggests, the same drivers, stokers, &c., as those engaged on the experiment with the *Bee*, more especially as Mr. HALL has offered to the directors to contract for the running of the trains at 20 per cent. less than the present cost of fuel—giving the needful security for the due performance of the contract. Indeed, we think that, in all cases of this nature, the patentee should have uncontrolled power in any experiments which may be made, so that no undue influence, private interest, or personal pique, on the part of any one employed, should deprive him of the benefits calculated upon from the successful application of his patent, or those advantages which might be derived by the company.

pute, it would practically fail in locomotive engines ; " and the result, he adds, " which has been ascertained on the Midland Counties Railway, completely confirms my opinion in every particular." If, however, Mr. HALL disproves the correctness of the allegation on the part of Mr. KEARSELY, we presume that Mr. HOOD will then re-consider the subject, and not hastily conclude that his opinions have been so completely confirmed. In Mr. KEARSELY's report, which Mr. HOOD quotes, it appears that "the consumption on the North Midland Railway, in these trials, was 25 per cent. more of coal than coke." It is observed by Mr. HOOD, that, "weight for weight coal will give 20 per cent. more heat than coke, when all the smoke is burned, and all the heat profitably applied ; but here we find, that, instead of 20 per cent. greater effect it was 25 per cent. less," and, therefore, the loss through the chimney must have been 57½ per cent. The correctness of the statement put forward by Mr. KEARSELY we leave to the patentee to examine, but it seems to us somewhat strange, that the results of the experiments of the *Bee*, on the Midland Counties Railway, of which Mr. K. is engineer, was not cited, as an illustration, rather than referring to another line, where, for aught he knew, much mismanagement might have arisen, as well as defects in the engine.

If Mr. KEARSEY will give us the results of the *Bee* we should be better satisfied, for it is notorious that, with the same materials, and with the same furnace, good foundry iron may be produced by working with one set of men, while, upon others being put to work it, common forge is the product, so much depending on management; and such is the case with the working of steam-engines, whether stationary or locomotive—a matter so well known as not to require comment—while the description of fuel employed will have its advantageous or pernicious effect; indeed, so much depends on circumstances, that it is hard to hazard an opinion without possessing more information than a hasty-drawn conclusion on effects, without looking to causes. Mr. HOOD, in conclusion, states, that while many inventions, with which he is conversant, "are perfectly suitable for stationary engines, Mr. HALL's appears the only one at present known which has offered even a remote chance of success when applied to locomotive engines." This expression of opinion should alone have precluded the remark which follows, in which he alludes to Mr. HALL's "injudicious and unjustifiable treatment of Mr. KEARSEY," as we feel assured, if Mr. HALL be correct in the statements put forward in his "refutation," Mr. HOOD will agree with us, that he had reason to expect that "the only one at present known" invention ought to have induced a kindly feeling on the part of engineers to advance it by their sug-

The losses of Mr. C. W. WILLIAMS impinge not only the correctness of the statements put forward by Mr. HALL, as to the verity of his invention, and the proofs said to be afforded of its applicability to locomotives, but distinctly charges Mr. HALL with having adapted the principle involved in the patent of the former gentleman, and thus to have directly pirated an invention to which Mr. WILLIAMS was alone entitled.—We further contended that "introducing air to the combustible gases evolved from coal" originated with him, and that Mr. HALL has attempted an infringement of such patent, but "that manifestly not understanding the principle, as to the chemical bearings, and the conditions on which alone the introduction of such air could be effective in converting such gases into steam rather than smoke, he (Mr. HALL) has so erroneously and unintelligently varied and the principle (which is, essentially, inseparably and chemically correct) as necessarily to fail in effecting the desired object."

which he proposes to show not only that Mr. HALL's application

is a "direct piracy," but that it has failed "in effecting the desired object," at the same time we should have been better pleased had Mr. HALL delayed his replication until Mr. WILLIAMS had brought the whole question before the public in a comprehensive form—the letter we have cited being merely a gratuitous introduction to the articles which are promised to follow. There is, however, certainly, one point on which we are not surprised that Mr. HALL should feel sensitive—that of the charge of piracy, and which has given rise to the publication of the letters inserted in our advertising columns.

It would appear thereby that Mr. HALL's patent was taken out in June, 1836, which, we believe, was amended or improved in 1838. In April, 1839, Mr. C. W. WILLIAMS addressed Mr. HALL a letter on the subject of his "smoke-burning patent," expressing a disposition to adopt it in a furnace he was then erecting, and requiring information. In June, 1839, or two months after such application, Mr. WILLIAMS takes out a patent, and which he contends is infringed by Mr. HALL in his *modus operandi* or application of the patent of 1836 or 1838. This is the case between the parties as to the piracy, and the real question to whom the merit should be awarded can only be determined by a close and attentive perusal of the specifications of the several patents. As it is a question of fact, we think these gentlemen would do well to meet amicably, and compare notes, and let the merits and advantages be awarded to the party who has the priority of claim—such would, in our opinion, be a more satisfactory and pleasing course to all friends of science, and to the parties themselves, than a controversy carried on through the press, in which personalities are indulged in, and charges preferred, which, whether true or false, might be readily determined by an inquiry being instituted, or reference being made to some mutual friend. We trust we shall not again have occasion to advert to the charges preferred, although our columns will at all times be open to explanation on both sides.

The report of the proceedings at the meeting of the Durham County Coal Company will be read with feelings of satisfaction by all who are anxious that not only should fraud and deception be exposed, but that those projectors who are detected in practising such course should be compelled to disgorge some of their ill-gotten spoil. It is now some time since we first drew attention to the "doings in the north," as instanced in the proceedings of the Durham County Coal Company, and we have only to express our surprise and regret that we have not been informed of the various "moves," so that we might have laid before our readers the progressive steps made in this matter, the result of which we now find is, that 32,000*l.* has been refunded, or, at least, security obtained for such amount, being repaid to the company from the "busy B's," and other projectors of this nefarious scheme, with 1000*l.* for law costs—being about one tithe of the amount which the proprietors were entitled to recover; but as Mr. LEMAN (a solicitor, and, therefore, no mean authority in this instance) said, it was better to compromise for such amount than incur the risk of the law, and, moreover, as it appeared that the ill-gotten wealth was speedily melting away. In this case, as in others, we take some credit to ourselves for having exposed the abuses practised, and we have every reason to believe that the exposure through our columns has attained for the shareholders the return mentioned. True it is, that many of the parties (*fostered by their view*) viewed matters very lightly, inasmuch that, having realised fortunes at the expense of the duped proprietors, they considered it only necessary to expend a part in resisting legal proceedings, trusting to the chances of the law to escape from the consequences to which they knew themselves to be liable, or otherwise to effect a compromise—in which latter expectation they successfully attained their object. It is, however, at least satisfactory to find that they have been mulcted, if such expression may be used, of 32,000*l.*, which passes into the coffers of the company, being 3*l.* 4*s.* per share, although, it is true 37*l.* per share has been paid, or 370,000*l.*, so that it is less than one tithe the amount of the subscribed capital. To those who have come in at the low prices to which the shares have fallen it is equal to 30 per cent. on the price paid by them; but as we are not aware what may be the amount of liabilities, or further capital required, we do not assume that it is to them a beneficial return to such an extent. We are glad to find that the directors have been met with kindly feelings by the proprietors or lessees of the collieries as to terms, and we trust that now they have honest men to deal with they will deal on honest terms.

The letter from a correspondent, on the alleged discoveries of Dr. PAVERNK, which have obtained frequent notice in our columns, calls for a passing remark. We are at all times well pleased to have the opportunity afforded us of recording the progress of science, and it was highly pleasing to find from the published statements of the result of experiments made by Dr. PAVERNK at the Royal Polytechnic Institution, in presence of many scientific men, and also on other occasions, that he had achieved more than, as we believed in common with others generally, had ever been accomplished. Our correspondent, whom we know to be a highly intelligent gentleman, and one on whose information every confidence may be reposed, asserts that however Dr. PAVERNK may have perfected the means employed, yet that he cannot claim the development of the principle which is due to FELTON—a man whose claims on the scientific world, and, indeed, on the community, will ever be acknowledged—whose name is in itself sufficient to excite feelings of admiration for the talents of the man, as they must also tend to emulate the aspiring student in his profession. We cannot, however, in the absence of other data than that afforded by our American friend, take it for granted that Dr. PAVERNK is a plagiarist, because we believe that there are but few exceptions in the present day where any man of science, who has regard for his reputation, would design to adopt the principles laid down by another without acknowledgment—although he would proudly boast of rendering such principles practically useful—for often is it that we find the germ is dormant, until nurtured by the expansion of knowledge it blossoms forth, and yields the produce contemplated, but which required time and careful attention to yield the promised or expected results.

In the present case we can well imagine that the same ideas may have been entertained by FULTON and Dr. PAYRNE, without any connection or knowledge on the part of the latter of the experiments made by FULTON, and noticed in the letter of our correspondent; yet, supposing even that he was in possession of the information furnished, that FULTON had, to a certain extent, accomplished the design, although it would appear not to have been on practical scale—yet it is not shown that the means adopted were novel or promulgated; and hence the project, like that of floating a balloon in the air, while merit may be given to GARNER and others, yet it would not detract from that which would be due to those who might, by improvement, apply the discovery to some practical use. The discovery of the powers of steam for a roadway and upwards laid dormant; FULTON first applied it to navigation—its powers were increased—its value more appreciated by the exertions of WATT—and yet at this moment steam may be said to be still in its infancy. We have said sufficient to excite attention, and shall cheerfully afford space to any communication bearing on the subject, but, in the absence of any knowledge of the means employed by FULTON, it is out of our power to determine how far our correspondent is right in his conclusion. It can only be by a comparison of the means employed that any opinion can be formed, and we invite information from "J. F. C.," as well as others, who may be in possession of any particulars on so interesting a subject.

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COAL-FIELDS OF GREAT BRITAIN.—No. III.

UPPER COAL SERIES OF LANARKSHIRE.—In the former article we described the nature of the substances which constitute the upper coal formation of Scotland, and promised to give a more particular account of the various workable strata of coal and ironstone in the present. This formation, which is quite conformable with the older members of our coal series, is included in a basin which terminates on the west, in the city of Glasgow, and on the east at Leven seat, near Wilsontown Iron-Works, a distance of twenty miles. The basin extends north to south from Garraik to Carluke, a distance of fifteen miles. The whole basin, exclusive of those portions which are occupied by trap and by red sandstone, of such thickness as to place the coal too deep to be workable, includes a space of about 140 square miles, the area of a fresh-water lake during the period of carboniferous deposition.

The upper series contains from twenty to thirty seams of coal, of various thickness; five or six of these, however, are all that have ever been wrought in one pit. These seams may be divided into the upper and the lower.

The upper contains five workable seams of coal, namely:—1. The upper or all.—2. The pyrit shaw.—3. The main.—4. The hump.—5. The splint.

The first coal varies much in thickness; near Glasgow it is four feet six inches; in Old and New Monkland it varies from two and a half to three and a half feet. In the parishes of Hamilton and Carluke it is ten feet thick. The following sections, the one made near the south-eastern extremity of the basin, and the other at the north-western, will afford an idea of the nature and extent of the formation and thicknesses of the workable coal; the two points are distant eighteen miles.

Section of the Low and Chapel Coal-fields.

	Ft. in.		Ft. in.
Freestone	21	Main coal	3
Shale	6	Falke	6
Upper coal	10	Hard sandstone	1
Soft shale	1	Freestone	12
Freestone	11	Mud bed	6
Shale	18	Falke	2
Coal shale	1	Soft shale	12
Freestone and shale	20	Freestone	13
Coal	2	Shale	4
Grey falke	7	Soft coal	6
Freestone and falke	30	Wild coal	1
Freestone	3		

Section of the Rathfron Coal-field, near Glasgow, from a Bore.

	Ft. in.		Ft. in.
Earth and clay	12	Shale	9
White sandstone	18	Sandstone	9
Shale with pines	16	Shale with ironstone pines	30
Shale	10	Third, or main coal	6
Single	6	Shale	47
First, or upper coal	4	Hard stone	6
Shale with pines	6	Fourth, or hump coal	3
Hard sandstone	16	Shale	1
Coal	10	Sandstone	6
Shale	10	Freestone	10
Second coal	5	Fifth, or splint coal	3
Shale	30	Shale	3
Mud, or marl band	1	Coal	1

The coals in the above sections are generally pretty uniform in quality, but vary in thickness, throughout the basin. In some places, however, one or more of them are bad and unworkable, from the presence of a whitestone bed, which occurs in connection with the formation in the parishes of Old and New Monkland. The splint and hump are the coals usually injured in this manner; they are either cubical or splint, or an admixture of the two—none of them are of a caking quality. The splint and hump, which, however, is only wrought at Govan, are the best for smelting iron. Smithy coal is obtained near Airdrie from the splint coal when affected by the whitestone.

The under portion of the upper coal series contains, near Glasgow, thirteen or fourteen seams, only one of which is thick enough to be workable; it is three feet thick, the rest are from twelve to eighteen inches in thickness. At Airdrie this portion of the series contains three workable seams:—

1. The Virtue Well coal 24 feet.
2. The Kiltongie coal 4
3. The Drumgray coal 2

The distances between these seams are very variable, as also their thickness. The first, at Calderbank, surmounts two feet or more; the second and third two feet six inches each, and situated at distances of six or seven fathoms from each other. The following section shows the condition of this portion of the series to the south of the basin.

Section of Minerals below the Splint Coal at Castlehill, near Carluke.

	Ft. in.		Ft. in.
Falke	3	Coal	4
Freestone	3	Basal falke	30
Shale	3	Grey ditto	3
Bituminous shale, with 2 inches of ironstone	4	Dark ditto	3
Mossy ironstone	10	Dark ditto	3
Fire clay	6	Shale	6
Coal	6	Grey falke	1
Fire clay	17	Coal	3
Shale and ironstone	1	Coal	3
Bituminous shale	10	Bituminous shale	3
Ironstone	6	Grey falke	1
Fire clay	13	White freestone	10
Hard rock	3	Ironstone	6
Soft shale	3	Shale	11
Fire clay	1	Fire clay	6
Shale	6	Falke	1
Coal	3	Fire clay	1
Fire clay	5	Falke	1
Freestone	6	Shale, with 1 inch, ironst.	4
Fire clay	6	Fire clay	6
Bituminous shale	1	Falke	6
Fire clay	1	Fire clay	6
Dark freestone	1	Falke	6
Shale	1	Coal	6
Dark freestone	1	Falke	6
Hard ditto	13	Shale, with three bands of ironstone, 7 inches	4
Coal	10	Ironstone	3
White freestone	7	Bituminous shale, with 4 inches of ironstone	3
Shale	1	White freestone	11
Ironstone	6	Coal	3
Bituminous shale	4	Shale	1
Coal	1	Coal	1
Fire clay	1	Fire clay	4
Coal	1	Bituminous shale, with 4 inches of ironstone	4
Falke	1	Coal	3
Freestone	1	Fire clay	3
Clay shale	3	Falke	11
Freestone	3	Freestone	3
Bituminous shale	3	Clay shale	1
Fire clay	3	Bituminous shale	1
Freestone	3	Blackband ironstone	10
Shale	6		

Below this there is no stratum which has been wrought of either coal or ironstone, except a bed of kidney-shaped balls, known by the name of the "cubby balls." There has also recently been discovered a fine red coal, but it has not been sunk to, so that its quality is, in a great measure, unknown. The reader by this time is furnished with a general idea of the nature, depth, and extent of the upper series of the coal formation of Lanarkshire. This, in a Treatise of this nature, is all that can be given, as the section at each place is somewhat different from the section of the same portion of the stratification at another.

Ironstone.—The first ironstone occurs twenty-four fathoms above the Ell end of the Monkland; it measures from twelve to fourteen inches thick. It is a blackband ironstone; it is wrought at present only in the colliery of Carluke by the Carluke Iron Company, but has also been found in the lands of Woodhall; a pit recently sunk at Carluke, through a portion of an upper sandstone, to the depth of sixty-six fathoms, passes through both this ironstone and the Airdrie blackband, and the whole course we have concentrated as overlying the Airdrie blackband ironstone. This is the only instance where the two bands have been found in the same "winding." The upper ironstone abounds with the remains of Ganoid (1) fishes, among which are the *Palmosodus* (2), the *Megalichthys* (3) Heberti, and the *Gyracanthus* (4) of Agassiz. It also abounds with several varieties of fresh-water corals, and the remains of plants, particularly *Calamites* and *Lepidodendrons*. These plants are singularly converted into columnar coal.

The next ironstone that occurs, one mile in the north-east Airdrie blackband; as already mentioned, this band lies from five to six fathoms below the splint coal; it measures generally about eighteen inches in thickness. The only place in which it has hitherto been wrought, are in the parishes of Old and New Monkland; but it has been recently found in Hamilton, near Larkhall, four miles from Hamilton, where it is said to measure nearly two feet in thickness. The following iron-works are principally supplied with the ironstone of this stratum:—Govan, 3; Falkirk, 4; Carluke, 6; Monkland, 1; Carluke, 1; in all 23 furnaces, such as ironstone, where it is, from 50 to 100 tons of pig-iron per week. It requires about three tons of raw ironstone to manufacture one ton of iron; it is used thus to produce a very great quantity of the raw material is consumed annually, and that the present source of supply must become exhausted ere many years have passed away; yet such is the abundance possessed of this mineral by some of the present ironmasters, that they have sold large fields of it, for obtaining 150,000, for a field of not more than 100 acres; and another 100,000, for the same area of a small portion of the ironstone in the Airdrie

estate, which draws 12,000, a-year for its ironstone alone. Withal, it is probable that the blackband will be exhausted in less than thirty or forty years.

The next ironstone is one four feet thick, which lies a few feet below the Airdrie blackband, at Airdrie-hill; it does not occur in any other locality that we know of; it is of inferior quality to the stratum above it. Another blackband occurs at Calderbank, near Airdrie, between the first and second coal, below the splint—it is attended by a layer of conical coal. The ironstone is about ten inches in thickness; it is used by the Monkland Company only. The next blackband is, perhaps, the last mentioned in the Castlehill section. It is wrought in the neighbourhood of Langrigg, in the parish of Whitburn; it is nearly of the same quality and thickness as the Airdrie blackband. It is used by the following iron-works:—Shotts, 3; Falkirk, 4; Carluke, 4; Castlehill, 3; Wilsontown, 1. These works also use clay ironstone, found in the lower portion of the upper coal series and in the lower coal series.

Muscleband Ironstone.—These are so valuable in an economical point of view, but are deeply interesting in exhibiting the condition of animal life during the coal era, and as indicating the contemporaneous origin of certain beds of coal in places remote from each other. These musclebands, as they are not improperly called, consist of the carbonate of iron and the carbon of extinct fresh-water molluscs of the genus *Avicula*. We have detected eight or nine different species—the largest occur in the lower beds. These shells have not yet been classified by any fossil conchologist. The shells in these bands lie in the most confused manner, but generally in a horizontal position. The first we know of is about twelve fathoms above the Ell coal. The second occurs between the pyrit shaw and the main coal; this is the *Cymbosia* marble. The next occurs between the splint coal and the Airdrie blackband ironstone; and the next above the Cleland high coal—the second workable seam of the lower portion of the series. Another occurs in connection with the Shotts' canal coal. We are not aware of any other. These bands, like the ironstones, containing besides the remains of molluscs, the teeth and scales of fishes, but we have never observed any plants.

The remains of vegetables occur in some places in great profusion. Among these *Calamites* (plants allied to the equisetum, or horse-tails), *Stigmaria*, *Lepidodendron*, *Aspidophylites*, and *Stigmaphyton*, particularly the last, are found most plentifully; there are also common to the lower coal series, but the shells are not—none of them occur in it—the shells are all different, and of marine genera.

(1) *Ganoid*, or ganoid, from the Greek word *ganos*, signifying splendour, applied to a class of fishes, furnished with regular angular thick scales, extremely enamelled; some of the phalanges, which were irregularly covered with large or small plates, or points, of enamel, like the rays or scales, according to Professor Agassiz, are the only fishes which existed prior to the coal formation. Of the ganoidians, fifty extinct genera have been recognized. (2) *Palmosodus*, a small ganoidian fish found with the *Megalichthys*. (3) *Megalichthys*, from *megas*, great, and *ichthys*, a fish. This fish is supposed to have been sixty feet in length; it was originally discovered in the limestone of Eborac, near Eborac, by Dr. Huxley. (4) *Gyracanthus*, from *gyra*, round, and *canthus*, a spine, or thorn. The *Gyracanthus*, like the *dog fish* (*Scorpaenopsis*), was furnished with curving dorsal rays, which served to raise the back fin.

EXPERIMENTS ON THE TENACITY OF WROUGHT-IRON.

BY JAMES NASMYTH, ESQ., C.E.

It may, perhaps, be interesting to some of the readers of your Journal to have an account of the results of some experiments which I have lately been making, with a view to obtain more correct knowledge of the nature of the important changes which take place in the tenacity of wrought-iron, when subjected to various kinds of treatment, more particularly as regards the employment of wrought-iron in the case of railway axles, &c. At all times any addition to our knowledge of the nature of those causes which induce changes in the tenacity of wrought-iron, ought to be considered as a subject of much importance, seeing that, in so many cases, our lives depend on the tenacity, or strength, of a piece of that material. This subject has, however, of late become infinitely more important, on account of the truly wonderful success and extension of the railway system; and as the whole of that vast improvement, in consequence, rests its success on the strength and tenacity of wrought-iron, any addition to our knowledge on that subject cannot, I trust, but be considered of value. The subject has, however, received much additional interest, on account of many theories and much controversy, which has arisen in consequence of an opinion which has been given forth from rather a prominent quarter—viz., the French commission appointed to investigate the causes which led to the late disastrous accident on the Versailles Railroad. The most remarkable part of the conclusions which that body gave forth, was in substance this:—namely, that however tough and strong a railway axle might originally be as it came from the hands of the maker of the axle, that the very fact of its being caused to revolve day after day in connection with the rails, would ere long, through the agency of some mysterious electrical (!) or magnetical influence, have its nature, as regards the toughness or tenacity of the iron, so impaired, as to become at length totally unsafe and unfit for use. A more truly alarming and uncomfortable doctrine could not have been produced than this, inasmuch as we should never be able to know when the point of uselessness was attained, except through the occurrence of one of those disastrous and melancholy accidents which have but too certainly attended the breaking of a railway axle; and as the above opinion was based on conjecture as to the supposed influence of the most dark, hidden, and mysterious of all Nature's agents, we might, therefore, have groped about in vain for such a knowledge of the subject as would be most likely to prevent such dangerous changes taking place in the tenacity of the iron; and, moreover, by having our attention diverted to so non-understandable a class of natural causes, we should be likely to cease to search for the cause, cure, and prevention (which I trust my experiments will go to prove, have more intimate connection with our workshops and workmen than with philosophers and their laboratories); and as the results of the experiments I have made on this subject are applicable to the treatment of wrought-iron generally in reference to its every day use, I trust that the results may be found of practical value—the more so, as they go to prove that we have the cure and prevention entirely at our command, without calling for the slightest additional labour or expense in the treatment of wrought-iron.

From former practical experience in the working of iron in the process of forging, I had always observed, that however tough, tenacious, and excellent in quality a piece of wrought-iron might originally be, that, by certain treatment, that tenacity might be all but entirely destroyed; and as such treatment is very frequently absolutely necessary in the forging of wrought-iron into certain forms, the knowledge of how to remove the bad effects consequent on such, became important to know. I am happy to state that this knowledge is so simple and easily put in practice, that I trust, in future, no piece of forged wrought-iron will hereafter be applied to its purpose without having been passed through so simple and salutary a process, which you will find requires neither skill, labour, or cost worth naming. Having made these observations, I shall now proceed to work.

It either is or ought to be known to all practical men concerned in the working of wrought-iron, that if a piece of the very best and toughest iron is hammered in the process of forging until it ceases to be red-hot, that the effect of such cold hammering, as I may term it, is to cause the iron to become so brittle, that it will in many cases break across in the process; or if it does not at that time, this process of cold hammering has so removed and destroyed its tenacity, as to render it capable of being broken with the slightest blow; in order to prove this by direct experiment, I took a bar of the very best wrought-iron, 1½-inch square, and subjected it to the following experimental tests:—

EXPERIMENT 1.—A bar of the very best 1½-inch square wrought-iron at temperature 60° (same as the first experiment), was laid over the edge of the anvil (as in the following

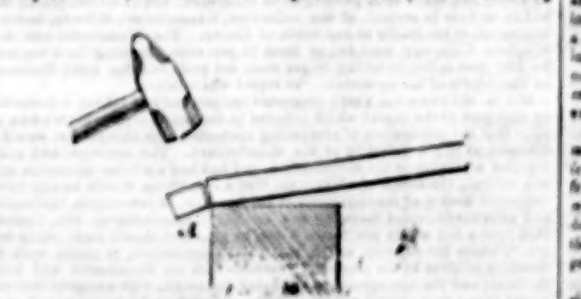


fig.), the end projecting about two and a half or three inches over of A; with some heavy blows of a large sledge-hammer it broke off short, as indicated in the figure, the fracture exhibiting that clear crystalline texture due to a good quality of iron at that temperature.

EXPERIMENT 2.—Part of the same bar of iron was taken and heated red-hot, and hammered till it was nearly white-hot; when it had arrived

at temperature 60° (same as the first experiment), it was placed on the anvil, with the end overhanging, as before, at A, one slight blow broke it sharp and square across, the fracture exhibiting a most beautiful clear crystalline grain, more like the fracture of steel than iron, but such a fine grain as would be (and, indeed, very frequently is) considered a proof of good quality—that is, fitness to be trusted to! So much for the appearance of the texture as a criterion of fitness. Here, then, we have distinct proof, by this experiment, that we have reduced the blow or shock-resisting quality of the iron fully ½ by the effect of cold hammering alone; and what renders the knowledge of the effects of such a process the more important is, that in most cases we shall find that, in order to give the piece of forged work the requisite finish and fine surface, as they come from the hands of our workmen in that department, that this very cold hammering and "swaging," as it is termed, is required, the more so as it is by such a process that iron forgings are so finished from the hammer, so as to require the least possible labour after, and as every good workman in that department is anxious to turn his work out of hand with the very best surface on it, which this cold hammering enables him to do, it is not a very easy matter, and (as I will soon show) not at all desirable, to require them to discontinue the practice, which many have endeavoured to do from want of a full knowledge of the subject. There is nothing inherently wrong in this practice of cold hammering—far otherwise; the evil rests with the applying such a cold hammered piece of forged work to its purpose without having been passed through the "curative process," which is simply this—namely, to heat the piece of forged work in question to a dull red heat, and lay it down to cool at its leisure. The value of this most simple process will be well illustrated by Experiment 3.

EXPERIMENT 3.—A piece of the same bar-iron as employed in the preceding experiments was, after being heated red-hot and hammered till cold (which cold hammering produced, as is usual, a most beautifully smooth surface, in which good workmen delight), again heated to a dull red heat, and laid down to cool at its leisure; being then at temperature 60°, it was placed over the edge of the anvil, as before, and after receiving 105 of



the most vigorous blows of the same sledge-hammer as was employed in the preceding experiments, it exhibited the most extraordinary evidence of tenacity, by resisting all attempts to break it, having passed into the form as given in fig.—that is, bent quite double, and the excessive distortion across the part B—C denoting the width across at E to decrease at least three-quarters of an inch, while the compression at the centre of bending caused the metal to expand a like quantity at F G. Every practical man knows that this is a most severe test of the tenacity of iron, and which the piece in question stood with the most perfect success, for, even after having received 105 blows, no evidence of fracture was visible.

This third experiment then brings us to this most important conclusion, that there is no inherent evil or ill effect produced by cold hammering, but far otherwise—namely, that by subjecting wrought-iron to the most violent hammering or compression at a low temperature, and then submitting the iron work as treated to the simple process of heating red-hot and slow cooling, that we have enhanced its tenacity, or shock-resisting qualities, at least twenty times. Here, then, we get hold of some facts which, I trust, I may consider to bear with some important effects on the treatment and use of iron, especially in the case of its application to railway axles, or, from their very required form, the process of cold hammering and swaging is all but absolutely necessary in forging the bar of iron out of which they are formed into the requisite shape.



The annexed figure is the form of a railway axle (one-half the length only is shown), as they are generally

made, the bearings being at A, the wheels being keyed on the part B. In forging such an axle, the bearings are formed with the requisite collars at the ends by hammering the iron at that part by a series of direct blows of the hammer, and giving them the requisite finish or precision of form, so far as can be done previous to being finished on the turning lathe, by means of tools called "swages," which consist of two pieces of iron covered with steel, and made smooth; and being of very nearly the same curve as the bearing of the axle, they enable the smith to transmit his blows with much greater precision, and also avoid all hammer marks.

The annexed fig. may, perhaps, serve to convey some idea of what is termed swaging. A and B are the upper and lower swages, which enable the smith to transmit the blow from the sledge-hammer with the greatest precision and to convert the blow of the hammer into a compressing effect over a very considerable surface of the cylindrical bearing of the axle. During the process the axle C would be laid in the semi-circular hollow of the lower swage B, while the upper swage would be kept firmly pressed upon the axle-bearing, so as to cause it to receive the blow the instant it was given on the top of the upper swage A. I have been the more anxious to detail this process, so it is to the effects of this swaging that we are to attribute the majority of cases of broken axles. Not that the process is bad in itself—far otherwise; it is only bad in its effects, provided we stop there. But if we only take the trouble to anneal such a swaged axle after it has received the most severe compression, by swaging or hammering at low temperature (i. e. 60°, or thereabouts), by simply heating it to a dull red heat, and laying it down to cool at its leisure, we should then, as in the case of Experiment 3, have a most extraordinary degree of toughness and shock-resisting quality consequent on it, in place of such a state as detailed in Experiment 2, with, in all probability, such disastrous results as there are but too truly and comely of.

I have also been anxious to detail these experiments, as they appear to me to bear directly upon the subject of railway accidents which have arisen from broken axles, in the investigation of which the appearance of the fracture of the broken axle has been made the criterion of fitness or otherwise of the iron for such use, and in many cases the iron has been condemned in consequence, when the real truth might, in all probability, be that it was simply the result of cold hammering, without the subsequent process of annealing at a dull red heat, as before-mentioned.

In the case of Experiment 2, we have what would in general be considered evidence (so far as texture or grain of the fracture goes) of very fine quality of iron; but what was its actual fitness I leave my readers to judge by the result of that experiment.

With all due reverence for scientific research, I cannot but think that in this subject, as in many others of the same nature, there is too great a tendency to heat after explanations of causes and modes of prevention, which, as before said, is of a merely scientific and subsidiary kind to, by

searching for them in our workshop rather than in our laboratories. I trust my readers will in general agree with me, that the result of these simple experiments tends to illustrate what I state on this head. Our workshop is (if rightly looked into) the true school of practical science, wherein theory may be seen in its really true state—namely, accompanied with all the circumstances which conspire to give the true result.

EXPERIMENT 4.—Being desirous to try the effect of temperature in influencing the appearance of fracture as regards crystalline texture, a part of the same bar, as in all the preceding experiments, was taken and warmed from 60° to 100°. Such was the effect of this 40° of additional heat, that, after receiving about fifty blows over the edge of the anvil, it passed into the form given in fig., the fracture being entirely fibrous, like wood, of a fine lead grey colour, and totally free from the appearance of any sparkling crystals. This experiment, then, warrants the conclusion that the appearance of the fracture is also no criterion of the quality of the iron, if temperature be left out of the question, inasmuch as 40° has not only vastly improved the tenacity, but also wrought an entire change on the aspect of the grain of the iron. It is well known to practical men that a very few degrees of heat will most materially affect not only the appearance of the fracture of iron, but also its tenacity. But for my reluctance to occupy more of the space of your excellent Journal, I should most gladly have given further details and experiments; but I trust such as I have endeavoured to describe will be in some degree acceptable, and be productive of useful results. I would most strongly recommend all who are interested in such matters, and who have the opportunity, to repeat the experiments themselves, as I doubt not the results would not only agree with what I have found and stated, but also tend to rivet the recollection of them in their minds, as the subject is one of the very highest importance to all, especially to those whose professional character and success may be influenced by possession or otherwise of such plain workshop facts.

I have no desire to make any great claim of discovery here, but I shall feel highly gratified, if what I have brought to light as to the vast accession of shock-resisting quality conferred on wrought-iron by the combined action of cold hammering and subsequent annealing should prove, as I am confident it will, a substantial benefit to all who have either their lives or property depending on pieces of wrought-iron, whether in the case of a railway axle or other application. I am an advocate for over-burdening the attention of engineers with compulsory clauses in specifications, but I would most strongly recommend attention to annealing of all bolts and axles, on which much depends. The recommended process requires no extra expense or trouble worth naming, and companies would do well to see that such was attended to.

Bridgeport Foundry, near Manchester.

HUNTER'S STONE-BORING MACHINES.

Some short time since Mr. Carnegie presented one of Hunter's stone-boring machines in the Institution of Civil Engineers, and explained its action to the meeting. This machine is composed of two parallel bars of steel, supporting a traversing carriage, through the centre of which passes a spiral auger attached to a screw bar; this bar fits into a female screw clamp above the carriage, and on the upper end is a wheel with four handles. When the instrument is in use it is fixed by two cramps upon the stone to be pierced, and the auger being made to revolve by means of the wheel, scoops out at each revolution as great a depth of stone as is equal to the distance which the screw descends; the chips ascending through the spiral channel of the auger, are thrown off at the top. The peculiar shape of the point of the auger prevents its being abraded, as it operates by chipping the stone, and not by grinding it away. This, with the means of forcing it down by the screw, is the chief novelty of the machine. It has been extensively used at the works of the new harbour of Arbroath by Mr. Leslie, who speaks of it in the following terms:—"Mr. Hunter's boring machine has been advantageously employed for above a year, in boring tunnel holes in the stones used at the new harbour of Arbroath. The holes are 12 inch diameter, and from nine inches to two feet in depth; the aggregate of the holes already bored amounts to upwards of 20,000 linear feet. The machine may be adapted for boring holes of any dimensions. It does the work considerably cheaper than the 'jumper,' and much more correctly as it makes the holes perfectly straight, cylindrical, and equal throughout, instead of the irregular form made by the common jumper. This machine is very well adapted for boring railway blocks, and has been much used in this quarter for that purpose. I consider it to be more especially valuable from the facility which it affords of boring and tunnelling down the stones used in sea buildings in any exposed situation, as I have found that annealing is a great security to such building while in progress, when the upper courses are much exposed and liable to be washed off unless they be held down by other means than their own absolute weight. The expense of boring the old red sandstone rock, here, is about 1½ p. per linear foot."

Mr. Vignoles bore testimony to the advantages of the machine; he was now employing it for piercing holes in stones going from Arbroath to the West India, for the construction of a patent slip—there was great economy of cost and time by its use in addition to the superior manner in which the holes were made.—Mr. Leslie was convinced of the advantages of the machine in working almost all kinds of stone, but more especially for those resembling the Arbroath stone, which were from a bed beneath the old red sandstone; they were of fine grained mingled with schistose debris. The action of the tool was like that of the stone-planing machine, in burst chips off instead of grinding down the surface by small portions and destroying the edge of the tool at the same time. With the planing machine it was common to take off a thickness of three inches at one passage of the tool—it acted like a "pick," and being fixed in a frame weighing about 1 ton, the power was great; at the same time there was little abrasion of the tool, and it never became heated or softened. It was probable that with other qualities of stone a screw with another pitch of thread might be required to force the auger forward, but with the thread now used in boring stones from the Arbroath quarries, the economy of time and cost appeared very great. In each of the blocks for the Arbroath Railway it was requisite to bore two tunnel holes 12 inch diameter and six inches deep—and to level a space nine inches diameter in the cut-out hole; this had been contracted for at 2½ p. per block, which was a material diminution of the usual cost. He was convinced that the instrument only required to be known to be advantageously used.—Mr. F. HASTON-WATTS had for some years used Hunter's stone-planing machines, for dressing up stone and other stones, and was well qualified to give a favourable opinion of the principle of its action; he believed that the machine, under discussion, being upon the same principle, must be very useful.

ROYAL SOCIETY.—The collection of celebrated portraits belonging to this scientific and literary body has recently received some valuable and interesting additions. Mr. Vignoles has presented one of the finest original portraits yet known of Sir Isaac Newton, one of the early presidents of the society. This portrait is by Van der Beeck, and was long in the family of the great founder of the Newtonian system. The committee of the Philosophical Society of Manchester, having a considerable sum on hand above the expenses of the Dalton monument, the balance remaining was set apart to defray the charges of a portrait of the venerable author of the absolute theory. This portrait of Dr. Dalton is a very fine one, and was presented to the Royal Society by the committee above named. Mr. Hudson Quarry, F.R.S., has presented a beautiful portrait of the late Dr. Thomas Young, by Mr. Briggs, R.A. Another fine portrait just added to the collection is that of the late John Dalton, F.R.S., who, in 1793, invented the atmospheric barometer. The portrait is from one in the Royal Observatory at Greenwich. In the council-room, is placed an exquisite marble bust, by Chantrey, of Mrs. Somerville, the wife of the Astronomer of the Museum. A large portrait, by Mr. Phillips, R.A., of the Duke of Devon, late president of the society, has recently been hung in the meeting-room. The library is undergoing a thorough re-arrangement.

CROWN SILVER.—Lord Jocelyn remarks:—"When the dollar first comes into the possession of a Chinaman, he gives it a stamp or chop, then extracting a small portion of the metal; observing the same chop from each land it passes through, it is reduced from its original value to that of nearly its weight. The possession of this official money, being the half-moon, seems to draw down the form of cross silver, a species more easy to assay than it is in the former coin, in which 1000 dollars would not exceed the value of 500. The cross silver is more valuable than any other, on account of its containing portions of gold-dust. It is generally in the form of a cross, with a stamp in the centre."

PROCEEDINGS OF PUBLIC COMPANIES.

DURHAM COUNTY COAL COMPANY.

At the half-yearly meeting, held at the Sun Inn, Darlington, F. S. STOKES, Esq., in the chair, the report of the directors was read, which stated that since the last meeting they had succeeded in arranging the claim against the original promoters of the company, who had paid or secured to the company the sum of 22,000l., and 1000l. for law expenses. The directors stated that the collieries had, during the half-year, suffered in common with the coal trade generally, from the general depression which had existed; that they were now seeking from the lessees of certain of the collieries for a fair reduction of the rents, and their applications had been received in a friendly spirit, and such as to induce the hope on the part of the directors that a considerable reduction would be made. Since the last half-yearly meeting the directors had obtained an extension of the lease of the Cockbe Colliery for forty-one years, and had also obtained an increased basis for vending the coals from Cockbe, but not to such an extent as the capabilities of that colliery justified them in seeking. The Stockton and Darlington Railway Company still withheld the monies justly due from them to this company, notwithstanding the unanimous decision of the Court of Common Pleas, and afterwards of the whole of the Judges in favour of this company. The suit had been commenced as early as 1837, and was ultimately decided in December last, in the Exchequer Chamber. The Stockton and Darlington Company then entered an appeal to the House of Lords, but had paid 4000l. into court, which was now funded, and bearing interest. The directors regretted that the Stockton and Darlington Company should thus delay the final settlement of the suit, after they had virtually admitted the correctness of the decisions against them, by reducing the dues on their railway. The directors further reported that their chairman and directing manager had intimated his intention to resign that office at the end of the next year, and it was therefore desirable that the company should, in the mean time, consider who was best adapted to fill that important and responsible office. They also reported that two vacancies had arisen among the trustees, and recommended that G. T. Andrews Esq., of York, and their chairman (Mr. Stokes), should be appointed to fill up such vacancies.

The reports of the viewer (Mr. M. Dunn) and of the auditors were read, after which the Rev. G. DIXON, of Holmsley, moved that the report of the directors be received and confirmed, and that the best thanks of the company were due to them for the zeal and energy with which they had carried on the proceedings against the original promoters of the company.

Mr. LEEKMAN, of York, seconded the motion, and in doing so observed that, notwithstanding the gloomy state of things, and the depression to which the company had been subjected, in common with the rest of the coal trade, the proprietors were, he believed, very generally satisfied that the present directors had done all in their power for the benefit of the shareholders at large. He was sorry, however, to find that the difficulties to which the company had been subjected should be increased, by the refusal on the part of the Stockton and Darlington Railway Company to refund to them what had been decided to be justly their due. As long ago as November, 1840, the Court of Common Pleas decided against the Stockton and Darlington Company, who thereupon took the matter for further argument before the fifteen Judges in the Exchequer Chamber, by which the decision of the Common Pleas was unanimously confirmed in December last. He had always understood that the Stockton and Darlington Company was composed of gentlemen known for their professions of attachment to peace, and aversion to litigation, being principally members of that respected body of men, the Society of Friends; and he confessed it was to him a matter of great surprise that these gentlemen should adopt the course which they were now pursuing. The Judges of the land had unanimously decided that the Stockton and Darlington Railway Company were in the wrong. Ought they not, then, as lovers of peace, at once to have restored the amount which they have illegally obtained from this company, instead of keeping up an opposition which could only result prejudicially to themselves? If there were any of the members of this company, who were also shareholders in the other, he respectfully suggested to them the propriety of urging upon their brethren to consider whether the course which they were now pursuing was one which, as fair and reasonable men, they could justify? He earnestly hoped that the other company would cease this delay and litigation, and at once withdraw further opposition. With regard to the Chancery proceedings against the promoters of this company, the directors had done their best; 32,000l. had been paid or secured, and although that amount bore but a small proportion to the extent of the injuries perpetrated against the shareholders, yet even that was better than to have gone on in law, for the directors found that the ill-gotten gain which the nefarious schemes of the promoters of the company had enabled them to obtain was fast disappearing, and it was exceedingly doubtful whether, if the suit had proceeded for a great length of time, any money at all would ultimately have been obtained from them; he therefore considered that the directors had acted most judiciously, and had great pleasure in seconding the motion proposed by Mr. Dixon. The resolution was carried.

Mr. PANTON, of Sunderland, moved, and Mr. E. DAVY, of York, seconded, the adoption of the viewer's report.

It was also moved and carried, that the report of the auditors be entered upon the minutes.—Several shareholders present entered into inquiries as to particular collieries, which were answered by the directors present.—A long discussion followed, in which Mr. T. C. Gibson and Mr. Atkinson, of Newcastle, Mr. Bell, of Sunderland, Mr. Burdick, of York, Mr. Ansley and Mr. Broadbent, of St. Helens, Mr. Ness, of Holmsley, Mr. Andrews, of York, and other gentlemen took part; and various suggestions were offered as to the future operations of the company.—A vote of thanks was passed to the chairman, and the meeting adjourned.

IRISH WASTE LAND IMPROVEMENT SOCIETY.

The adjourned meeting of this company, which was to have been held, pursuant to the Act of Parliament, at the King's Head, Poultry, on Thursday, the 15th inst., was adjourned, there not being a sufficient number of proprietors present to constitute a meeting. The Act provides that the adjournment should be for only seven days, consequently the proprietors will again assemble on Thursday, 18th inst.

MANCHESTER AND BIRMINGHAM RAILWAY.

The half-yearly general meeting of this company was held in Manchester, on Friday, 25 inst. T. ARNOLD, Esq., in the chair.

Captain CLAYTON read the directors' report, which congratulated the proprietors on the removal of the obstacles which had prevented the opening of the line to Crewe, and on the arrangement which had been made with the Grand Junction Company, under which that company agreed to provide locomotive power, and all other conveniences, for working the traffic between Crewe and Birmingham, and to pay all taxes and duties upon passengers or otherwise, on terms which, under all circumstances, were considered satisfactory. The directors had prepared an estimate of the total cost of completing and furnishing the railway between Manchester and Crewe, which they felt confident would not be exceeded. The total amount expended up to the present time was 1,758,311l. 2s. 6d.; further capital required, 127,000l. 10s. 3d.—Total outlay, 1,885,311l. 12s. 9d. But this amount included about 50,000l. expended on that portion of the Manchester station to be occupied by the Sheffield Company, for which an adequate return in rent would be obtained, and about 40,000l. the estimated value of land and materials to be received. The directors had caused the requisite notice to be given, for an application to Parliament in the next session, to authorize the construction of a tunnel to form the proposed junction with the Manchester and Leeds line, at Hunt's Bank, should it be sanctioned by the proprietors; and they had now obtained the necessary estimates of the proposed works, which amounted to 60,000l. In connection with the contemplated junction with the Manchester and Leeds Railway, the directors had made an arrangement with the directors of that company, under which, should the proprietors sanction the proposed junction at Hunt's Bank, the Manchester and Leeds Company consented to withdraw all competition with the Manchester and Birmingham Company in the Manchester and London traffic, on terms satisfactory to the directors.

In reply to a question by Mr. David Peire, as to the terms of the agreement with the Grand Junction Company, Mr. NEWBURY stated that the Grand Junction Company agreed to provide locomotive power and all other conveniences for working the traffic between Crewe and Birmingham, to pay all duties and taxes upon passengers or otherwise, to do everything that had to be done in respect of the collection, transmission, delivery, and management, of the traffic at and from Crewe. The Manchester and Birmingham Company were to pay them 70 per cent. for doing their business for fifty line miles, receiving 30 per cent. net profit.—After some discussion on the details of the agreement, the report was received.

Mr. G. MURDOCH (of York) suggested the propriety of taking a discussion on that part of the report which referred to the tunnel.—Mr. NEWBURY replied that the publication of everything connected with this subject would be detrimental to the interests of the shareholders. The directors had called together a number of the shareholders, and had had a private discussion upon this subject, the result of which was, that a committee should be appointed, composed mainly of the opponents of the junction, to investigate the matter, and afterwards report the result to a meeting of shareholders. Mr. Newbury then read a list of six gentlemen whom he proposed should form, along with others whom the meeting might nominate, a committee, to confer with the directors relative to the proposed junction with the Manchester and Leeds Railway, and the arrangements connected therewith, with a request that they would report to a special meeting of the proprietors to be convened on an early day.—Mr. GIBSON, in reply to the Manchester and Leeds Company having refused their due to the junction with the Manchester and Leeds Company, and upon that of the Manchester and Leeds.—Mr. NEWBURY assured the gentlemen who had just spoken that the Leeds directors had broken no faith whatever with the Manchester and Birmingham Company.—After a long and interesting discussion, principally in relation to the nature of the agreement or agreement between both companies given to the general meeting in February,

a committee of fourteen gentlemen was appointed to carry out the object proposed by Mr. Newbury.—After some further discussion, the thanks of the proprietors were unanimously voted to the chairman, and the meeting separated.

MANCHESTER AND LEEDS RAILWAY.

The half-yearly meeting of this company was held at Hunt's Bank, Manchester, on Thursday, the 1st instant.

HENRY HOULDSWORTH, Esq., in the chair.

Mr. NEWBURY (one of the directors) read the report, which stated that the total receipts during the half-year had been 109,747l., or, on an average, 4321l. per week, which, with the receipts for the half-year ending December last, 116,774l., would give an average for the twelve months ending on the 30th of June last, of 4356l. per week. The total expenses chargeable on revenue for the six months ending on the 30th of June last had been 45,841l., including 6436l. for rates, taxes, and duty on passengers, and 5508l. for maintenance of way, the whole of which had previously to these six months devolved upon the company; and coupling this result, as before, with that for the preceding half-year, they found that upon a total gross receipt for the twelve months of 226,521l., the total expenses had been 85,277l., or 37½ per cent., exclusive of the charge for depreciation of working stock, which it was proposed to deduct from the income of the second six months in each year, as a means of equalising the net profits of the two half-years, and maintaining the spring and autumn dividends at an equal rate, notwithstanding the unequal receipts of the two periods. The proportion of interest on borrowed money chargeable on revenue account for the half-year ending on the 30th of June last, after taking credit for interest received, amounted to 33,107l., so that the total charges upon the revenue for the half-year consisted of—Working expenses, 38,604l.; rates, taxes, and duty on passengers, 6436l.; balance of interest chargeable on revenue, 33,107l., or a total of 78,151l.—leaving a net surplus upon the half-year of 31,595l., which formed, together with the reserve of undivided profits, a sum of 44,531l. at the disposal of the company, independent of the depreciation fund in hand, which remained for the present 7605l., as formerly stated. Out of this undivided profit, the directors recommended that the income tax be paid, and, in addition, a clear dividend to the proprietors of 3s. 6d. on the 100l. shares, and 16s. 6d. on the 50l. shares—being at the rate of 2½ per cent. for the half-year; and 2s. on the 25l. shares, or 5 per cent. for same period. These payments would amount to 37,961l., leaving 6935l. as a reserve to be carried forward to the next half-year. The total disbursements of the company on capital account, up to the 30th of June last, amounted to 2,913,110l., leaving 335,890l. of capital unexpended. The contracts upon the main line were all, with the exception of three, wound up and settled, as well as those on the Oldham and Heywood branches. During the half-year the directors had procured what capital they required at a reduced rate of interest, and had also renewed, on favourable terms, a considerable proportion of the earlier bonds which had become due. They had also every prospect, from the improved state of the money market, and the increased confidence of capitalists in placing their money in railway securities, of lessening by degrees the charge for interest on the borrowed capital of the company. The land for the Halifax branch had been purchased, and the cost of the Oldham branch had not exceeded the estimate of 45,000l. given in the last report. The report next referred to the amicable arrangement which had been entered into between the Liverpool and Manchester and Manchester and Leeds Companies for the immediate completion of the Hunt's Bank station, and the directors entertained a confident expectation that the line for the transit of goods would be completed in the course of the ensuing spring, and that the whole line would be opened, together with the joint passenger station at the central point of Hunt's Bank, during the following autumn.

The CHAIRMAN addressed the meeting at some length, principally in reference to the diminution in the revenue for the past half year, respecting the cause of which, however, there could be no great difference of opinion. On the Manchester and Liverpool Company the traffic in passengers had been diminished to about 7 per cent. compared with the corresponding six months of last year. The Bolton Company's revenue had fallen off 940l. in the half-year, being at the rate of 9½ per cent. The Grand Junction Company had been affected to the extent of 4000l., and the Manchester branch of their traffic particularly had been affected to double the extent, or to the amount of 8000l. This, he thought, would satisfactorily show that they had a right to set down either the whole or a part of the deficiency to these causes; and if the companies named had suffered to the extent of 7 to 10 per cent., as he had shown, he thought no one who looked to the district through which their line ran, who looked also to the character of their traffic, and seeing how much their traffic was dependent on the local condition of the population of Manchester, could help arriving at the result, that the amount of deficiency adverted to (about 34 per cent. in their passenger traffic) was less than they had reason, under the circumstances, to expect. The chairman concluded by moving the adoption of the report, which was seconded, and carried unanimously.—A resolution for the payment of the amount of dividend recommended was also carried, after which a vote of thanks was passed to the chairman and board of directors, and the meeting separated.

DUBLIN AND DROGHEDA RAILWAY.

At the half-yearly general meeting, held at Dublin, on the 1st inst., the directors' report and statement of accounts were read, which last showed that there had been received on shares for the half-year 28,800l., from miscellaneous sources of income, 9266l.; total receipts for the half-year, 38,276l.; total amount of expenditure, 33,871l.; and that the balance in hand, including that brought over to the account at the commencement of the half-year, was 19,564l.—A long conversation ensued upon the superiority of this line over all others, and ultimately the report was received, and the thanks of the meeting having been voted to the different officers of the company the meeting adjourned.

DUBLIN AND KINGSTOWN RAILWAY.

A special general meeting was held at Dublin, on Tuesday, the 6th instant, to authorize the directors to affix the seal of the company to a deed of mortgage executed to the Board of Works for a sum of 25,000l.

J. PEARCE, Esq., in the chair.

Mr. PEARCE (the secretary) said that everything would be ready forthwith to proceed with the undertaking, and that, according to a statement made by Mr. Dargan, the earthworks, bridges, excavations, &c., would be completed in three months, and the line be completed for a sum within their engineer's estimate. The railway would be open in a few months, and there was no doubt that the novelty of it would attract such additional numbers as would go a good way in defraying the cost. It would be the first fair trial given to the atmospheric principle of traction, and, if it succeeded, the company, as well as the passengers, would reap considerable advantage.—The CHAIRMAN said, although they had not met for the purpose of receiving an account of the financial affairs of the company, or the progress they had made since their last meeting, it might be satisfactory to state that, compared with the same period of time last year, their receipts were 1000l. more at present than they were then, although during the former season they had the attraction of a man of war in Kingstown, which drew great crowds to see it. On the whole, although there was nothing to attract passengers the receipts were 1000l. more during the present summer months than the last.—Mr. GRANT asked what security the patentees had given to secure the company from loss, in case their invention did not succeed? He thought their leaving a sum of 25000l. in the hands of the company was by no means sufficient. They were to get a sum of 11,000l. or 12,000l., whilst the company were besides to advance all the works necessary for the machinery, and would, on the whole, have upwards of 20,000l. sunk in the undertaking, whilst the only check they would have on the patentees would be the retention of 25000l. in their hands.—Mr. PEARCE said, that even if the atmospheric principle did not answer, the line would be applicable to horse-power, and the company could not, on any account, lose more than 25000l.; but even that sum could be hardly lost, for, if the experiment did not succeed, the machinery and iron which would fall into the hands of the company would still be a considerable sum.—The CHAIRMAN said that the patentees had a much deeper interest in the undertaking than the railway company, and he had no doubt that success was certain.—A motion for the execution of the deed was carried unanimously, and, after a little unimportant conversation, the meeting adjourned.

NORTHERN AND EASTERN RAILWAY COMPANY.

At the special meeting of the shareholders of this company, held at the London Tavern, on Wednesday, the 7th inst., the subject of discussion was the expediency of leasing the line for a term of years. When the half-yearly general meeting took place last month, a communication from Mr. PEARCE was read, in which an application was made to the directors to ascertain if it was probable the proprietors would be inclined to accept a loan for their railway of a capital of 1 per cent. upon their paid-up capital, and their participation in profits realized beyond a certain sum. This the directors had not under their own consideration, and though appearing desirous, in the present position of railway property, to accept of such a rental from good and sufficient parties, they stated as their opinion on the subject, that difficulties would present themselves in the course of such negotiation, as, in all probability, would prevent a conclusion satisfactory to the shareholders. They, however, also stated their unwillingness to intrude the decision the board had come to, as the one which should guide the meeting in the matter which it might appear advisable to adopt, and, therefore, it was deemed prudent to leave the subject open to the shareholders, to say whether or not a committee should be appointed to carry out, if possible, the lease proposed. From the general discussion entered into, it would appear the directors doubt that a net profit of 2 per cent. should be secured to the company, while the lease proposed should be extended, and can take and to have the lease counterbalanced with various stipulations, which, if introduced, it seemed to be believed would however have the effect of throwing on the hands of the proprietors a quantity of machinery, &c., unsuitable to a certain class

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ment of a New Mexico.—"In part seventh of my Journal, you will observe next week, you will find a notice of the *Ammonoites*; it has been named *didyma*; it always occurs in pairs from which unfortunately it has not yet been separated either on laminae, or as well as those on corals, it is the subject of a letter from Professor Fossadale to W. Fossadale."

Washington and others, who were present, literally admitted that there was a large proportion of the new shares. A disposition was also expressed to wait on the other London and the Washington shareholders, in order to obtain, if possible, a general agreement for reducing the capital of the line. The opinion of the company agents here had been to wait, from the west of a proper understanding between the creditors and the directors, but now this theme is continued by the described arrangement, it may be hoped that some

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